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METRIC

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PERFORMANCE SPECIFICATION
FOR THE
SURVEILLANCE SYSTEM, SCOUT, LONG RANGE, AN/TAS-8( ) (LRAS3)

This specification is approved for use by USACECOM, Department of the Army, and is available for use by all Departments and Agencies of the Department of Defense (DoD).

1 SCOPE

1.1 Scope. This specification describes the performance requirements for the Long Range Advanced Scout Surveillance System (LRAS3).

2 APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: PM-NV/RSTA, ATTN: SFAE-IEW&S-NV-SGF, 10221 Burbeck Rd., Fort Belvoir, VA 22060-5806 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 5855-310

SPECIFICATIONS

DEPARTMENT OF DEFENSE

MIL-PRF-A3207380	Performance Specification for the Horizontal Technology Integration (HTI) NV-80 B-Kit

STANDARDS

FED-STD-595B	Colors Used in Government Procurement
MIL-STD-2169B	High Altitude Electro-Magnetic Pulse Environment

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings and publications form a part of this document (as pertains to necessary interfaces only) to the extent specified herein. All military and Government specifications and/or standards cited in the following documents are for reference only and should be disregarded and do not form a part of the requirements herein. Unless otherwise specified, the issues are those cited in the solicitation.

19207-12339679	Pedestal Assembly
19207-12339680	Adapter Assembly, T. U. Mount
19207-12339682	Adapter, T. U. Mount

(Copies of the above documents can be found on-line on the World Wide Web at Uniform Resource Locator (URL) http://www.edms.redstone.army.mil/ .)

A3271784	Interface Control Document (ICD) for the Horizontal Technology Integration Program NV-80 B-Kit
ICD-SLP-200	Interface Control Document for the Sensor Link Protocol

Joint Technical Architecture-Army (JTA-Army) Version 5.5

Copies of the above document can be found on-line on the World Wide Web at URL http://arch-odisc4.army.mil/aes/aea/jta-a/jtaa55/html/jtaa55.htm .

Bulletin No. 7	CECOM Safety Office Technical Bulletin, Battery Box Design Guidelines for Equipment Using Lithium Sulfur Dioxide Batteries.

Copies of the above document can be found on-line on the World Wide Web at URL http://www.monmouth.army.mil/cecom/safety/SPUB/TB7.HTM.

2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation.

ANSI/NEMA Z535.1	Safety Color Code
ANSI/NEMA Z535.4	Product Safety Signs and Labels
AFGL-TR-80-0067	Computer Code LOWTRAN 7
ANSI Z136.1	American National Standard for the Safe Use of Lasers
NIMA TR8350.2	Department of Defense World Geodetic System 1984, Its Definition and Relationships with Local Geodetic Systems, Third Edition, 4 July 1997,

(Copies of the above documents are available from the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

ASTM-D975	Diesel Fuel Oils, Specification for

(Copies are available from American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.)

SMPTE-170M	SMPTE Standard for Composite Analog Video Signal NTSC for Studio Applications: dated 1994

(Application for copies should be addressed to Society of Motion Picture and Television Engineers (SMPTE), 595 W. Hartsdale Ave., White Plains, NY 10607)

Infrared and Electro-Optical Systems Handbook, editor: George J. Zissis, Environmental Research Institute of Michigan.

(Copies are available from the publisher, SPIE Optical Engineering Press, P.O. Box 10, Bellingham, Washington 98227-0010.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3 REQUIREMENTS

3.1 Description. The LRAS3 is a multi-sensor system that includes a Forward Looking Infrared (FLIR) sensor, a day video camera (DVC), an eyesafe laser rangefinder (ELRF), and a far target location (FTL) capability. The LRAS3 is a long range reconnaissance and surveillance system that provides a real-time target detection, recognition, and identification capability to the cavalry scout while operating 24-hours a day in adverse weather conditions.

The LRAS3 operates in a vehicle stationary configuration while mounted on the host vehicle's turret ring assembly platform. The system shall also be removed from the vehicle onto a man portable tripod for dismounted operations.

The host vehicles for the system will be either the M1114 Up-Armored High Mobility Multi-purpose Wheeled Vehicle (HMMWV) or the M1025A2 HMMWV. Any reference to "host vehicle" in this document will refer back to these vehicles.

3.1.1 Operating modes.

3.1.1.1 Mounted. The LRAS3 shall not be damaged (3.9.1) and shall meet all requirements specified herein while mounted on the host vehicle. The LRAS3 shall be capable of remaining in a "ON" or "STANDBY" mode of operability while on the move. The LRAS3 shall be capable of meeting the performance requirements while stationary with the vehicle engine on or off. The system shall also remain operable during vehicle start-up procedures without experiencing a power loss that disrupts operation.

3.1.1.2 Dismounted. In the dismounted mode, power shall be provided by the power sources (3.2.5.6). The system shall meet all performance requirements while dismounted.

3.2 Performance.

3.2.1 General. The requirements of this specification shall be met without damage (3.9.1) or degradation of performance (3.9.2) while operating in either the mounted or the dismounted mode. Unless otherwise specified, the following performance requirements shall be met over all environmental conditions specified herein.

3.2.2 Target location accuracy. The LRAS3 shall provide target location for targets at ranges up to 10 km within a 60 meter circular error probability (CEP) [required] and 40 meter CEP [desired] (3.9.5). The FTL subsystem shall be capable of determining the LRAS3 line-of-sight (LOS) inclination angle, and shall be capable of providing target directional bearing in azimuth and elevation. No initialization or calibration requirements, except boresighting per 3.2.2.4, shall be placed on the LRAS3 operator. Accuracy shall be met in narrow field-of-view (NFOV) with stationary targets. Target location accuracy shall be met in atmospheric conditions and targets per Appendix A.

3.2.2.1 Coordinate system. The LRAS3 shall have the capability of displaying target and sensor location in both standard Military Grid Reference System (MGRS) and Latitude/Longitude (Lat/Long) coordinates (as determined by the GPS). Lat/Long shall be displayed in Degrees, Minutes, Seconds. The choice between MGRS and Lat/Long shall be operator selectable. The default coordinate system shall be MGRS.

3.2.2.2 Target location data. The LRAS3 shall be capable of presenting target and sensor location in any of the map datums defined in FIGURE 1, as a minimum. The datum parameters and coding shall be in accordance with NIMA TR8350.2. Selection of the map datum for the LRAS3 target and sensor location display shall be via external programming of the LRAS3 GPS receivers. The default map datum in the absence of external reprogramming shall be WGS 1984.

3.2.2.3 Sensor and target location update rate. The line of sight bearing and LRAS3 position data shall be updated and available to the LRAS3 operator at a rate of at least once per second. The target location data shall be updated within one second of ELRF range trigger.

3.2.2.3.1 Target location data display time. The target location data shall be displayed until the next ELRF range trigger.

3.2.2.4 Boresight. The sensor LOS of the ELRF, FLIR, DVC, and reticles shall have and maintain boresight alignment such that the LRAS3 target location accuracy requirements are met. It is desired that the LRAS3 maintain boresight over all environmental (3.7.4) and operational conditions, and that no manual boresight module be required. At a minimum, over temperature variations of ±20°C from the last boresight temperature, no manual boresight procedure shall be required. For temperature variations in excess of ±20°C, a manual user boresight procedure is acceptable. If a manual boresight is necessary the LRAS3 shall inform the user.

3.2.2.5 System growth. The system shall be configured in an open systems architecture (OSA) type approach. The system shall provide a minimum of one additional board slot for future system enhancement. The system design approach shall comply with the applicable portions of the Joint Technical Architecture-Army. Any proposed technical designs that deviate from the standards and practices delineated in the Joint Technical Architecture-Army, either during the evaluation and/or subsequent execution of this contract, shall be approved by the Army Digitization Office (ADO), through the Program Manager, prior to implementation. The Joint Technical Architecture-Army document is located on the World Wide Web at URL: http://www.hqda.army.mil/webs/techarch/."

3.2.3 Common performance requirements. The requirements herein are applicable to the entire system, and apply commonly to each sensor or component as part of the entire LRAS3.

3.2.3.1 Magnification. The system magnification of the FLIR and DVC shall be matched to less than ±8 percent.

3.2.3.2 Wide field-of-view (WFOV) LOS alignment. The LOS which defines the center of the WFOV shall be aligned to within 5 mrad of the LOS which defines the center of the NFOV. When switching FOVs, the target shall remain in or near the center of the FOV.

3.2.3.3 WFOV LOS retention. The WFOV LOS shall retain its alignment to the NFOV LOS within 1.5 mrad over a maximum temperature variation of ±20°C. When switching FOVs, the target shall remain in or near the center of the FOV.

3.2.3.4 Field-of-view (FOV) switch time. The WFOV/NFOV switch time shall be no greater than 2.0 seconds.

3.2.3.5 Range focus. The focusing range shall be from 500 meters to infinity in the NFOV. The WFOV focusing range shall be from 100 meters to infinity. In either FOV, the LRAS3 shall have the ability to traverse through the entire FLIR range focus within 10 seconds. DVC focus shall be fixed at infinity for both NFOV and WFOV.

3.2.3.6 WFOV/NFOV automatic focus compensation. Automatic focus shall be incorporated such that once the operator has manually set focus for each of the NFOV and WFOV, subsequent toggling between FOVs shall not require any further manual focus adjustment.

3.2.3.7 Distortion. The distortion of the displayed image shall be no greater than 6%.

3.2.3.8 Image rotation. The image displayed to the operator of a horizontal target shall be parallel to the mounting plane of the LRAS3 sight to within 2 degrees. The image displayed to the operator of a vertical target line shall be perpendicular to the mounting plane within 2 degrees.

3.2.3.9 Symbology and reticles.

3.2.3.9.1 Symbology. The LRAS3 shall have the capability to generate symbology on the display. At a minimum, sensor location, target location, range, sensor elevation and azimuth, sensor mode and current time shall be presented to the operator on the display as shown in FIGURE 2. The time presented via symbology will be downloaded from GPS system. Compliance with JTA-Army Version 5.5 shall be required.

3.2.3.9.2 Reticle. The LRAS3 shall be provided with a visible reticle. The reticle shall be in accordance with Thermal Imaging System (TIS) Symbols - WFOV and NFOV as shown in the ICD A3271784 (Appendix IV, 40.5) and modified per FIGURE 9. The reticles shall be displayed on both FLIR and DVC video, in both FOVs, and shall be available at the analog port (3.2.5.9.1.3).

3.2.3.9.3 Symbology and reticle brightness. The brightness of the symbology and reticle shall be independently variable.

3.2.4 Sensor performance requirements.

3.2.4.1 Forward Looking Infrared. The FLIR shall have performance parameters defined in Appendices A and B of this document. The FLIR performance shall meet or exceed comparable requirements specified in MIL-PRF-A3207380 (3.2.3, 3.2.5.2, 3.2.6.5, 3.2.7, 3.2.9.1, 3.2.9.5, 3.2.9.5.1, 3.2.10.1, 3.2.10.2, 3.2.10.2.2, 3.2.10.2.3, 3.2.10.2.4, 3.2.10.3.1, 3.2.10.3.4.1.) The NV-80 B-Kit and SADA II solution is provided as reference and any solution that meets this performance requirement is acceptable.

3.2.4.1.1 Field-of-view. The FLIR shall have a minimum of two (2) FOVs.

3.2.4.1.1.1 Narrow field-of-view. The NFOV shall be a minimum of 1.5±0.075 degrees in elevation and 2.667±0.133 degrees in azimuth, providing a nominal 16:9 aspect ratio.

3.2.4.1.1.2 Wide field-of-view. The WFOV shall be a minimum of 4.5±0.225 degrees in elevation and 8.0±0.4 degrees in azimuth, providing a nominal 16:9 aspect ratio.

3.2.4.1.2 Minimum resolvable temperature difference (MRTD). The FLIR shall meet the range requirements of Appendix A with frame integration provided in the GFE HTI B-Kit.

3.2.4.1.3 Noise equivalent temperature difference (NETD). The FLIR shall meet the range requirements of Appendix A with frame integration provided in the GFE HTI B-Kit.

3.2.4.1.4 Image polarity. The FLIR shall provide image contrast polarity control, switchable between black and white hot. The switching delay in contrast reversal for the image polarity shall be less than 0.3 seconds. The display shall indicate the state of the image polarity.

3.2.4.1.5 Optical filters. A set of optical filters shall be provided to meet the requirements of Appendix B.

3.2.4.1.6 Image uniformity. When viewing a uniform temperature blackbody source of 290±5 Kelvin, the output video signal shall contain no non-uniformities in excess of: 10% of the total video dynamic range at maximum in any Local Area (3.9.4), 20% of the total video dynamic range across the entire FOV, where the total dynamic range is defined as a manual gain setting for which the output dynamic range is 2.0±0.2°C.

3.2.4.1.7 Electronic zoom. The FLIR shall include an electronic zoom capability that shall meet or exceed comparable requirements specified in MIL-PRF-A3207380 (3.2.10.3.4.2). The NV-80 B-Kit and SADA II solution is provided as reference and any solution that meets this performance requirement is acceptable.

3.2.4.2 Day video camera.

3.2.4.2.1 Field-of-view. The DVC shall have a minimum of two (2) FOVs.

3.2.4.2.1.1 Narrow field-of-view. The DVC shall provide a 1.5±0.075 degree vertical NFOV which nominally matches the FLIR vertical NFOV. The DVC horizontal NFOV of 2.0±0.1 degrees shall provide a nominal 4:3 aspect ratio.

3.2.4.2.1.2 Wide field-of-view. The DVC shall provide a 4.5±0.225 degree vertical WFOV which nominally matches the FLIR vertical WFOV. The DVC horizontal WFOV of 6.0±0.3 degrees shall provide a nominal 4:3 aspect ratio.

3.2.4.2.2 Optical Hardening. The DVC shall meet the requirements of Appendix B.

3.2.4.2.3 Limiting resolution. As a minimum, the DVC system will provide limiting resolution that meets the requirements stated in Appendix A. The DVC system includes all elements from the first optical element up to and including the observer.

3.2.4.2.4 Image frame rate. The image frame rate shall be equal to or greater than 30 Hz.

3.2.4.2.5 Bright Sources. The DVC shall not be damaged when exposed to bright sources equivalent to direct solar radiation in any terrestrial environment in the DVC field of view for up to 10 minutes. The DVC shall provide for full performance within 1 second after removal of the bright source.

3.2.4.2.6 Blooming. The DVC shall be capable of withstanding illumination over-exposures of 1000 times the saturation level without blooming.

3.2.4.3 Eyesafe laser rangefinder.

3.2.4.3.1 Probability of detection. The ELRF shall allow 99% probability of detection for the performance requirements specified in paragraph 3.2.2.

3.2.4.3.2 False alarm rate. The false alarm rate shall not exceed one (1) false reading in one hundred (100) ranges in all operational average background radiance conditions.

3.2.4.3.3 Range accuracy. The ELRF shall determine the range to the target with an error equal to or less than 3 meters for one standard deviation and read out the range to the system.

3.2.4.3.4 Range. The minimum range capability of the ELRF shall be 100 meters, without damage to the ELRF from reflections from a very high reflectivity target. The ELRF shall have a maximum capability to readout ranges to 19,995 meters. The measurement increment shall be no greater than 5 meters.

3.2.4.3.5 Target discrimination. Distinct targets shall be detected when they are separated by 20 meters or more in range. The ELRF ranging logic shall provide multiple target indication. The ELRF ranging logic shall provide range data for first or last target return for each ranging operation, as selected by the operator.

3.2.4.3.6 Receiver field-of-view. The ELRF receiver FOV shall be adequate to support the range performance requirements within all operational average background radiance conditions.

3.2.4.3.7 ELRF Laser Safety. Laser design shall be eyesafe class I as per ANSI Z136.1.

3.2.4.3.8 Repetition rate. The ELRF shall be capable of accepting and responding to range commands from the LRAS3 operator at a rate of no less than 1 per second for 15 seconds every minute (25 percent duty cycle).

3.2.4.3.9 Optical Hardening. The ELRF shall meet the requirements of Appendix B.

3.2.5 Other component performance requirements.

3.2.5.1 Programming language requirements. Maximum utilization/reuse of NDI/COTS software requiring minimal to no modification is encouraged.

3.2.5.2 Mission critical computing resource (MCCR) reserve requirements. MCCR architecture shall be in accordance with JTA-Army Version 5.5.

3.2.5.2.1 Processor throughput. Each new processor used shall have a minimum of 50 percent reserve throughput capacity for other than Government Furnished Equipment (GFE).

3.2.5.2.2 Bus utilization. At least 50% of the available bus time line for any new processors shall be available for future growth.

3.2.5.2.3 Non-volatile memory. At least 35% of the non-volatile program memory shall be unused in the initially delivered system.

3.2.5.2.4 Volatile memory. At least 50% of the volatile memory shall be unused in the initially delivered system.

3.2.5.2.5 Input/output (I/O) channel utilization. The I/O channel shall have at least 50% reserve bandwidth in the initially delivered system. The LRAS3 shall have at least two unused serial data channels.

3.2.5.3 Biocular Display. The biocular shall display high resolution imagery sufficient to meet the performance requirements. The operator shall be able to switch between sensors while viewing a single, common display. A red/black display is not acceptable.

3.2.5.3.1 Display brightness. The display brightness shall be sufficient to enable ten gray shades to be visible to the operator with the eyecup in place under direct sunlight conditions.

3.2.5.3.2 Ambient lighting conditions. The LRAS3 shall meet the requirements of this specification under ambient lighting conditions ranging from 10^{-4} Lux (overcast night sky) to 10^{+5} Lux (direct sunlight).

3.2.5.4 Controls. Operating controls shall be easily identified during darkness and easily accessible to the operator both barehanded and in arctic or nuclear, biological, and chemical (NBC) protective clothing. The operators and maintainers of LRAS3 shall be able to perform all tasks while wearing all current seasonal uniforms to include NBC protective face masks and clothing under mission oriented protective posture (MOPP) I through MOPP IV. The LRAS3 shall be operated via handgrips as shown in FIGURE 8.

3.2.5.4.1 System mode. The LRAS3 shall provide a mode control to enable the operator to select an operational mode of the system. The available modes shall consist of the following as a minimum:

a. OFF - System is not operating.
b. STANDBY - System is in a standby mode, FLIR cryocooler is cooling down to operating temperature. The GPS is initializing. Any other electronics that need to warm up or charge prior to operation are initializing.
c. ON - TV ONLY - DVC, LASER, and GPS are operating. The FLIR is in soft-standby (not scanning, analog power to front end electronics disabled).
d. ON - BOTH EO SENSORS - FLIR, DVC, LASER, and GPS system are operating. FLIR and DVC are accessible but not displayed at the same time.

The following other controls include but not limited to:

a. Range logic select
b. LASER fire
c. FLIR and DVC controls
d. Focus
e. FOV/zoom magnifications
f. Gain/level mode select
g. Gain and level
h. Symbology and reticle brightness
i. Reticle boresight adjustment
j. Filter mode
k. Filter select
l. Video rate
m. Contrast
n. Brightness
o. Zeroization of GPS related non-volatile data and crypto keys

Controls not specified in the handgrip configuration (FIGURE 8) shall follow the menu trees outlined in FIGURES 10, 11 and 12, when possible.

3.2.5.5 Traversing mechanism. The host vehicle turret rotation and the traversing mechanism shall allow panning of the LRAS3 for search operations over a 360 degrees field-of-regard (FOR) and +45 degrees to -15 degrees in elevation. The traversing mechanism shall incorporate an azimuth rotational stop to limit binding of the system cable inside the mechanism. The traversing mechanism shall be keyed to the vehicle to allow a minimum of ±90 degrees azimuth motion from a nominal LOS in the absence of external obstructions, including a vehicle mounted weapon. The traversing mechanism shall support the LRAS3 during vehicle mounted operation. The traversing mechanism shall not interfere with the normal operation of the turret or turret hatch and shall mount onto the host vehicle. The traversing mechanism shall be detachable from the vehicle. The traversing mechanism shall incorporate a self contained quick release/attach mechanism to facilitate easy removal and installation of the LRAS3. The traversing mechanism shall have the capability of being manually adjusted under tension and locked/unlocked separately in both azimuth and elevation.

3.2.5.6 Power. LRAS3 shall operate on both vehicle and battery power. Battery packs shall be provided for operation of the LRAS3 in the dismounted configuration. The battery pack shall be compatible with the preferred Army family of batteries or a commercial standard and shall not be modified. The battery shall be rechargeable. Enough battery packs shall be provided to provide a minimum of six (6) hours [required], eight (8) hours [desired] continuous operation at temperatures of -20°C to 55°C. The LRAS3 shall support the ability to hot swap (ability to replace the battery packs during operation, without losing operational capability). Battery enclosures shall meet the safety requirements of paragraph 3.8.3.3.7 if Lithium Sulfur Dioxide ($LiSO_2$) batteries are used. In addition, a power indicator shall be displayed to warn the operator when dismounted battery power is low. At -20°C and above, the LRAS3 shall require no more than three battery packs to support 6 hours of operation. The size of the battery pack including latches and connector shall not exceed 0.381 m (15 inches) length by 0.343 m (13.5 inches) depth by .305 m (12 inches) width.

3.2.5.7 Battery charger. A battery charger shall be provided and shall be compatible with the preferred Army family of batteries or a commercial standard.

3.2.5.8 Tripod/Dismounted Yoke (TDY). A lightweight tripod with an integrated yoke Traverse Unit (TU) are required to support the operation of the LRAS3 in the dismounted mode. This TDY shall incorporate leveling apparatus (e.g. bubble level) which shall allow unobstructed visual access while the LRAS3 system is attached. Any free hardware used in the quick disconnect/connect function of the TDY shall be captive. The Dismounted Yoke and Tripod shall be capable of separating into independent components. The TDY shall safely support an LRAS3 Sight Sensor weighing a maximum of 68.1 kgs (150 pounds) (additional weight to support future growth). The total weight of the TDY shall not exceed 15.8 kgs (35 pounds). The TU shall provide movement for unobstructed and unvignetted search operations over a 360 degrees FOR and from +45 degrees to -15 degrees in elevation.

3.2.5.9 Data ports. The LRAS3 shall provide the following analog and digital ports for export of imagery and system operational data. Any imagery or data available at the ports shall be transferable in its entire format.

3.2.5.9.1 Output ports. The LRAS3 shall have the capability to output DVC Video, FLIR video and system data. The LRAS3 shall interface to the Force XXI Battle Command, Brigade and Below (FBCB2) Applique′ via a point-to-point RS-232 physical interface, as defined in the Sensor Link Protocol ICD, ICD-SLP-200 (Revision "-", 14 September 1998).

3.2.5.9.1.1 Compressed digital video port. The compressed digital port shall provide an 8-bit digital, 16:9 aspect ratio without symbology image in accordance with ICD A3271784 (3.1.7.4.2.1).

3.2.5.9.1.2 Digital compressed video port data rate. The digital compressed video port shall output 30 Hz frame, 60 Hz field rate digital video to match the frame and field rates of SMPTE 170M.

3.2.5.9.1.3 Analog video port. The LRAS3 shall generate two analog video outputs defined in ICD A3271784 (3.1.7.4.1), one with symbology and one without symbology.

3.2.5.9.1.4 System parametric data port. The LRAS3 shall provide a digital data port that shall be used to output target data and system status information. All operator controls (3.2.5.4.1), with the exception of the System Mode control (ON/OFF/STANDBY), shall have the capability for remote operation from the data port.

3.2.5.9.2 Input ports. The LRAS3 shall accept one asynchronous analog video input in accordance with ICD A3271784 (3.1.7.3).

3.3 System characteristics.

3.3.1 Operational.

3.3.1.1 Readiness time. The LRAS3 shall be capable of full performance in all environmental conditions within 15 minutes from power-up.

3.3.1.2 Operational time. The LRAS3 shall be capable of continuous operations for greater than 96 hours in the mounted mode.

3.3.2 Interface definition.

3.3.2.1 Mechanical.

3.3.2.1.1 Vehicle interface components. The LRAS3 shall be provided with the necessary cabling and wiring as well as the mechanical, electrical and optical components required to assemble, mount, integrate and operate the LRAS3 with the host vehicle. The LRAS3 shall mount to the host vehicle using either the pedestal assembly, Drawing 12339679, or the traversing unit mount adapter, Drawing 12339682, as appropriate to the design. The vehicle power cable shall be routed through the center of the pedestal assembly or traversing unit mount adapter.

3.3.2.1.2 Electrical power.

3.3.2.1.2.1 Input power requirements. The LRAS3 with associated vehicle interface components shall meet the performance requirements of this specification with the following input power conditions.

3.3.2.1.2.1.1 VPC Input Power Conditions.
a. Steady State Voltage; 19.5 - 32 VDC.
b. Ripple; 2 V peak with 21.5 V- 33 V mean, 50 Hz - 200 kHz.
c. Surge; 55 volts, 200 ms
18 volts, 500 ms
d. Spikes; ± 250 volts, 50 microseconds.

3.3.2.1.2.1.2 Sight Sensor Input Power Conditions.

a. Steady State Voltage; 18-32 VDC.

3.3.2.1.2.2 Power conditioning. The LRAS3 will not be damaged (3.9.1) by under/over voltage conditions, power dropout, electrical polarity reversal or transients induced by vehicle engine startup or disengagement. The LRAS3 operation shall not be impacted by vehicle startup conditions.

3.3.2.1.2.3 Main Power. The LRAS3 shall include the ability to switch power on/off from inside the host vehicle as close to the input power leads as possible.

3.4 Security.

3.4.1 Physical. The size, shape and vehicle installation of the LRAS3 shall be designed so as to minimize changes to the signature of the host vehicle.

3.4.2 Reflections/Emissions. The LRAS3 shall be designed to minimize reflections of any kind, for example: sunlight glint. The LRAS3 shall not emit any type of optical radiation which is detectable by the unaided human eye at a distance greater than 50m [required] 15m [desired].

3.4.3 Audible noise. The LRAS3 shall be inaudible to the unaided human ear during operation at a distance of 50m [required]/15m [desired] in all directions under any conditions.

3.5 Reliability. The LRAS3, including dismount equipment, shall have at least a 95 percent probability of completing a 17-hour mission without degradation of performance (3.9.2) with 80 percent confidence when operated under any of the conditions stated in this specification.

3.6 Maintainability. The LRAS3 shall be designed to minimize the associated maintenance burden. The LRAS3 shall be designed for easy access to its assemblies for maintenance purposes, specifically removing and replacing the assemblies from the LRAS3.

3.6.1 Quantitative Maintainability. The Mean-Time-To-Repair (MTTR) at the Operator level shall not exceed 2 minutes. The Mean-Time-To-Repair (MTTR) at the organizational level shall not exceed 30 minutes, and the Mean-Time-To Repair (MTTR) at the Direct Support (DS) level shall not exceed 4 hours. GPS self survey time shall not be included in the MTTR calculation.

3.6.2 Qualitative Maintainability. The LRAS3 shall be designed to be maintained in accordance with the following maintenance concept: Operator maintenance shall consist of normal cleaning of the sensor, dismount equipment and lens/window. Organizational (Unit) maintenance shall consist of Preventive Maintenance and Check Service (PMCS), removal/replacement of ancillary equipment (e.g. lens cleaning material, protective lens cover, eyecup, handgrip, tripod, and batteries, etc.). Direct Support (DS) maintenance shall include fault isolation, removal/replacement of faulty module, final operational checks, and system purging (if required).

3.6.3 Built-in-test (BIT).

3.6.3.1 BIT functions. The LRAS3 BIT shall be capable of performing BIT automatically or at the response to external commands. The BIT function shall identify, report and record LRAS3 failures. If no failures are detected, the LRAS3 shall indicate a “No Detected Failures” status. The LRAS3 shall implement three types of BIT: power-up BIT (PBIT), continuous BIT (CBIT), and operator initiated BIT (IBIT).

3.6.3.2 BIT coverage. When operated in a mounted and/or dismounted LRAS3 configuration, the LRAS3 shall sufficient BIT to support the following coverages:

a. The LRAS3 sensor unit (including left and right hand controls) shall detect at least 95 percent of the failures using BIT.

b. The LRAS3 shall isolate to the failed LRU’s (sensor unit, left hand control, and right hand control) to at least 90 percent of the failures.

3.6.4 LRAS3 Sensor unit shop replaceable unit (SRU) fault isolation. The LRAS3 sensor unit shall incorporate provisions to allow fault isolation for at least 95 percent of all detected faults to the faulty SRU: using BIT, a programmable maintenance aid, such as the Army’s- Soldier’s Portable On-System Repair Tool (SPORT) automatic test equipment (ATE), and manual testing. These methods shall not include SRU replacement except when the fault exists on the inter-SRU interface or wiring.

3.7 Design and construction.

3.7.1 Physical.

3.7.1.1 Weight. The LRAS3 shall be manportable by a two man carry, allowing one man to return/move between the vehicle and the observation post. Total sensor weight (excluding tripod, battery pack, and auxiliary equipment) shall weigh no more than 54.4 kilograms (120 pounds). The battery pack shall weigh no more than 17.7 kilograms (39 pounds).

3.7.1.2 Size and shape. The physical size and shape of the LRAS3 shall not interfere with the effective operation of the vehicle mounted crew served weapon.

3.7.1.3 Color. The color shall be Green 383, Color #34094 of FED-STD-595B, except for the lifting straps, TDY, biocular eyecup, handgrips, cables, in-vehicle items, knobs, miscellaneous fasteners, hardware, switches, connectors and GFE. The color of other items shall be submitted for Government approval.

3.7.2 Identification and marking. The LRAS3 provisioned components, test points, and connectors shall be clearly labeled internally and externally with their appropriate reference symbols to facilitate identification in applicable operating and maintenance documents.

3.7.3 Electromagnetic Interference (EMI). The LRAS3 shall be compatible with the intended host vehicle, associated equipment aboard the host vehicle, and other equipment associated with a typical scout mission. This compatibility includes both the system's susceptibility to other system emission and its effect on other applicable systems. The EMI protection of the LRAS3 shall meet or exceed the comparable requirements specified in MIL-PRF-A3207380 (3.8.3). The NV-80 B-Kit and SADA II solution is provided as reference and any solution that meets this performance requirement is acceptable. GPS/GPSIS performance shall not be required when in-band electric fields in the GPS L1 and L2 frequency bands are present.

3.7.4 Environmentals.

3.7.4.1 Environmental conditions and transportation. The LRAS3 shall be ruggedized so as to be capable of storage, transportation, and operation when exposed to the static and dynamic conditions expected to be encountered during field use. The LRAS3 shall be designed to survive shipping and transportation, in a non-operational state, by all military and commercial wheeled, tracked and air modes of transportation. The LRAS3 shall be ruggedized to meet all of the operational environments of the host vehicle, as defined in paragraphs 3.7.4.2 through 3.7.4.14 below.

3.7.4.2 Temperature. The LRAS3 shall not be damaged and shall meet the requirements of this specification, except the variance allowed in Appendix A, when subjected to the temperature conditions shown in Table I.

TABLE I. Temperature.

Temperature	Operational	Storage	Shock
71°C (159.8°F)		X	X
60°C (140.0°F)	X		
-32°C (-25.6°F)	X		
-51°C (-59.8°F)		X	X

3.7.4.3 Altitude. The LRAS3 shall not be damaged and shall meet the requirements of this specification during exposure to altitudes between 396.5 meters (1300 feet) below sea level, 3,048 meters (10,000 feet) above sea level, and after non-operating exposure to altitudes of up to 15,240 meters (50,000 feet) above sea level.

3.7.4.4 Vibration. The LRAS3 shall not be damaged when subjected to the swept sine on random vibration spectrum of FIGURES 3, 4 and 5 for 60 minutes per axis. The LRAS3 shall be operable after exposure to gunfire vibration sine and random spectrum as indicated in FIGURE 6 and 7 for 10 minutes per axis. Full performance shall not be required during exposure to these levels for FIGURES 5 and 6.

3.7.4.5 Shock. The LRAS3 shall meet the requirements of this specification and not suffer damage as a result of three sawtooth shocks of not less than 20 g's of 11 ms duration in both directions on each axis of the LRAS3. The LRAS3 shall also meet the requirements of this specification after being subjected to shocks normally encountered when carried to a combat situation by man, truck, and rail and shall withstand the usual shocks encountered during typical bench maintenance or repair. Full performance shall not be required during exposure to these levels.

3.7.4.6 Humidity. The LRAS3 shall meet the requirements of this specification during and after exposure to the effects of a warm, humid atmosphere ranging from 59%-88% at temperatures ranging from +31^{o} C to +41^{o}C for a period of not less than 240 hours.

3.7.4.7 Resistance to moisture. The LRAS3 shall operate during and after exposure to rain. The LRAS3 shall prevent the penetration (seepage) of water into the enclosure and shall not be damaged when heated to a temperature of 27^{o}C higher than the water then immersed totally to a depth of a minimum of 30" (to the top of the unit) for 30 minutes (non-operating). The LRAS3 shall withstand normal water cleaning when sprayed with pressurized water. Full performance shall not be required during exposure to this test.

3.7.4.8 Resistance to fungus. The LRAS3 shall not be damaged or have its function impaired after exposure to fungus and/or adjacent fungal growth during and after a period of exposure to viable fungal spores for not less than 28 days at a relative humidity of not less than 90% and a temperature range of 24^{o}C to 31^{o}C.

3.7.4.9 Salt fog. The LRAS3 shall not be damaged (suffer corrosion effects, electrical effects or physical effects) following exposure to an environment where there is an aqueous sea-salt atmosphere of sodium chloride and sodium iodide.

3.7.4.10 Sand and dust. The LRAS3 shall not be damaged and shall operate without degradation of performance during and after exposure to fine sand and dust particles with only the exposed lenses/windows protected. Full performance shall not be required during exposure to this test.

3.7.4.11 Solar radiation. The LRAS3 shall not be damaged or suffer degradation of performance during and after exposure at a temperature of $+49^{o}$C and solar radiation.

3.7.4.12 Chemicals. The LRAS3 shall not be damaged after exposure to vapors on and in direct contact with the following materials for an extended period of time:

a. Fuel per ASTM-D975 (commercial diesel No. 1-D or No. 2-D, JP-4 or JP-5).
b. Hydraulic fluid.

3.7.4.13 Biological and chemical (BC) contamination survivability. The LRAS3 shall meet the decontaminability, hardness, and compatibility requirements of Appendix C.

3.7.4.14 High altitude electromagnetic pulse (HAEMP). The LRAS3 shall meet the requirements of Appendix D.

3.8 Logistics.

3.8.1 Shop replaceable unit (SRU) interchangeability. The LRAS3 shall allow SRUs with the same part numbers or national stock numbers to be replaced or interchanged without specific matching with other SRUs or degradation of the LRAS3's performance (3.9.2).

3.8.2 Tools and test equipment. Additional special tools or special test equipment shall be minimized at the crew unit or direct support level for installation, replacement, alignment or repairs. Special tools and test equipment, if required, shall require approval by the Government.

3.8.3 Manpower and personnel integration (MANPRINT).

3.8.3.1 Manpower. Operation and maintenance of the LRAS3 shall not require any new Military Occupational Specialty (MOS).

3.8.3.2 Personnel. Operation and maintenance of the LRAS3 shall not require any increase in personnel characteristics (e.g; grade, aptitude, skill level, and physical qualifications) beyond the target audience personnel who operate and maintain the current FLIR systems. The LRAS3 shall be operable and maintainable by the 5th percentile male soldier through the 95th percentile male soldier and repairable and supportable by the 5th percentile male and female soldier through the 95th percentile male and female soldier, from the applicable target audience, while dressed in all appropriate uniforms and under all environmental conditions. This includes lifting and transporting the system.

3.8.3.3 Safety. The LRAS3 shall have no conditions, materials, operations or functions which are hazardous to the operator, and/or maintenance personnel. The LRAS3 and its components shall comply with the following:

3.8.3.3.1 Fail-safe. The LRAS3 design shall provide fail-safe features for safety of personnel during the installation, operation, maintenance, and repair or interchanging of a complete assembly or component part.

3.8.3.3.2 Electrical. The design of the LRAS3 shall incorporate methods to protect personnel from inadvertent contact with voltage capable of producing shock hazards.

3.8.3.3.2.1 Power cut-off. Means shall be provided so that power may be cut off while installing, replacing, or interchanging the LRAS3, or any part thereof.

3.8.3.3.2.2 Grounding. The design and construction of the LRAS3, shall insure that all external electrically conductive parts, surfaces, and shields are at ground potential at all times during normal operation.

3.8.3.3.2.3 Personnel protection. The LRAS3 design shall incorporate methods to protect personnel from accidental contact with voltages in excess of 30 Volts rms or dc during normal operation of the LRAS3. All contacts, terminals and like devices having voltages greater than 30 Vrms or dc with respect to ground shall be guarded from accidental contact by personnel if such points are exposed to contact during direct support or operator maintenance.

3.8.3.3.3 Radioactive material restriction. Radioactive materials shall not be used in the LRAS3 design except optical components, which shall contain no thorium or other source materials, in excess of 0.05 percent by weight (500 ppm).

3.8.3.3.4 Hazardous and restricted materials. Hazardous materials shall not be used in the LRAS3 design without the prior approval of the government. The use of toxic pollutants in the manufacture, design, and/or operation of the LRAS3 shall be minimized.

3.8.3.3.5 Equipment safety. The LRAS3 shall be designed to minimize equipment damage (3.9.1) due to operator induced errors, improper cabling, power failure, installation, handling, or maintenance. Danger/Caution labels shall be used to warn of specific hazards, such as voltage, current, thermal or physical in accordance with ANSI/NEMA Z535.1 and ANSI/NEMA Z535.4.

3.8.3.3.6 Lifting requirements. The LRAS3 must be designed so that it may be safely installed/removed from the host vehicle, given space and personnel constraints imposed by the host vehicle crewstation and weapon interference.

3.8.3.3.7 Batteries enclosures. Battery enclosures shall be designed to minimize the risk of personnel injury or system damage (3.9.1). Should Lithium Sulfur Dioxide (LiSO2) batteries be inserted, enclosures shall be designed of energy-absorbing material, and provide sufficient free-space volume to preclude major system damage (3.9.1) or serious personnel injury in the event of a violent venting of a LiSO2 battery. Free-volume versus expected pressure ratios for specific batteries are available in CECOM Safety Office Technical Bulletin No. 7, Battery Box Design Guidelines for Equipment Using Lithium Sulfur Dioxide Batteries.

3.8.3.4 Facilities. The LRAS3 shall be capable of being maintained in existing Army field maintenance and depot facilities.

3.9 Technical interpretations. The following technical interpretations shall be, when referenced in section 3, mandatory for this specification.

3.9.1 Damage. Damage is defined as any degradation or impairment of the performance of the item or any evidence of physical damage such as binding, bending, jamming, chipping, cracking, peeling, pitting, corroding, breaking, warping, splitting, brittleness, charring, flowing, melting, optical scratches, and optical deterioration including fogging or misting internally.

3.9.2 Degradation of performance. Degradation of performance is defined as any event that results in degradation of the equipment to a degree such that the equipment cannot meet system performance requirements as specified in this document.

3.9.3 Qualified product. A product that has successfully met all the requirements of an Initial Production Test (IPT) witnessed by PM-NV/RSTA or its designated representative. Should the supplier make substantial changes in the process used to produce a qualified product, or have not delivered the qualified product to the Federal Government within 12 months of contract award, an IPT shall be performed to the extent necessary to verify continued compliance to specification requirements for all characteristics of the product affected by the changes.

3.9.4 Local Area. The Local Area is a rectangular area of one-fourth of the vertical FOV by one-fourth of the horizontal FOV.

3.9.5 Circular Error Probability. CEP is defined as the circular area formed with the actual target location at the center point of the circle and the required CEP as the radius. At least fifty percent (50%) of the LRAS3 measured target location grid points for any target shall fall within the area of this circle.

4 VERIFICATION

4.1 Classification of inspections and tests. The verification and test requirements specified herein shall be classified as follows:

a. Initial Production Test
b. Conformance inspection

5 PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.1.c). When actual packaging of materiel is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6 NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.
b. Issue of DoDISS to be cited in the solicitation.
c. Packaging requirements (see 5.1).
d. Date of issue of individual documents referenced by this specification (see 2.1 and 2.2.1).
e. Color (see 3.7.1.3).
f. Vibration and shock requirements (see FIGURES 3, 4, 5, 6 and 7).
g. Special tools and test equipment(see 3.8.2)

6.2 Subject term (key word) listing.

Ground
Manportable
Night vision
Target

Custodian:
Army - CR

Preparing Activity:
Army - CR
Project (5855-310)

Datum Name	Datum Name
ARC 1950-Mean Value	Liberia 1964
ARC 1960	Luzon-Philippines
Australian Geodetic 1966	Massawa
Australian Geodetic 1984	Merchich
Bogota Observatory	Minna-Nigeria
Campo Inchauspe 1969	Nahrwan-Saudi Arabia
Cape	North American 1983
Carthage	North American 1927- CONUS
Chatham Island Astro 1971	North American 1927-Alaska
Chua Astro	North American 1927-Canada Mean Value
Corrego Alegre	North American 1927-Central America
European 1950-West Europe	Old Egyptian 1907
European 1950-Cyprus	Ordinance Survey Great Britain 1936-Mean Value
European 1950-Egypt	Old Hawaiian-Mean Value
European 1950-Iran	Pitcairn Astro 1967
European 1950-Sicily	Qatar National
European 1979	Qornoq
Oman	South America 1969 - Mean Value
Gan 1970	Schwarzeck
Geodetic Datum 1949	Timbalai 1948
Hjorsey 1955	Tokyo-Mean Value
Indian 1954 - Thailand	WGS 1984

Datum Name	Datum Name
Indian - India,and Nepal	WGS 1972
Ireland 1965	Zanderij
Kertau 1948	

FIGURE 1. Minimum Required operational datums.

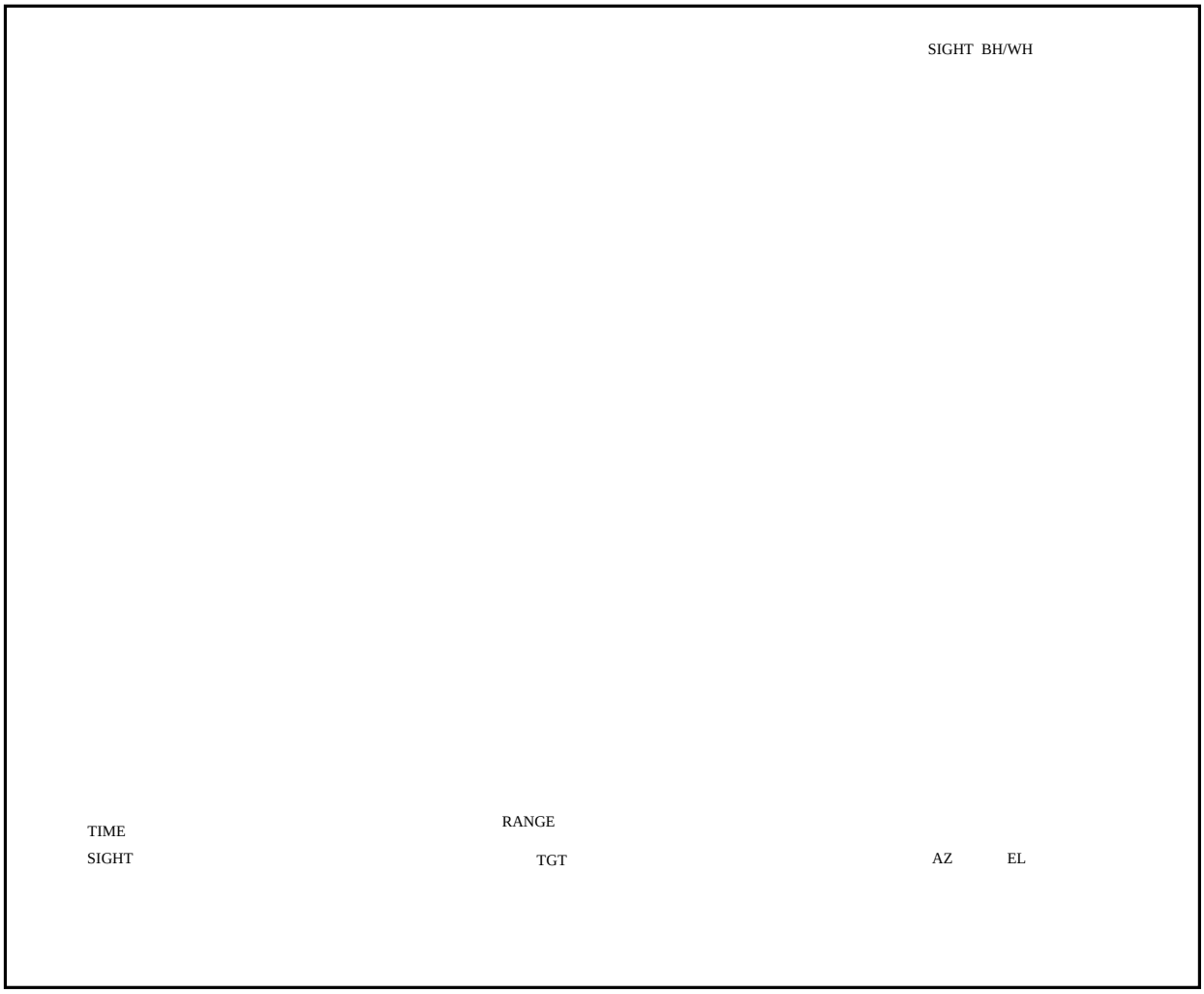

FIGURE 2. Display Requirements.

Frequency (Hz)	Acceleration Spectral Density (g^2/Hz)		
	Longitudinal	Transverse	Vertical
1	1.0E-7	5.0E-7	4.0E-7
2	1.5E-8	4.0E-8	5.0E-8
3	7.0E-9	2.0E-8	2.0E-8
4	2.0E-8	1.3E-8	9.0E-9
4.5	1.0E-8		
5		2.0E-8	1.3E-8
5.5	6.0E-7	1.0E-7	7.0E-8
5.5	6.0E-7	1.0E-7	7.0E-8
6	3.0E-7	6.0E-8	4.0E-8
6.5			3.0E-9
7	4.0E-9	4.0E-9	
8			3.0E-9
9	3.0E-8		
9.5		6.0E-9	1.0E-8
10	2.0E-8		
11	2.5E-6		6.0E-6
12		3.0E-7	8.0E-7
12.5	4.0E-8		
13		3.0E-7	2.5E-6
13.5	6.0E-7		
15	7.0E-8	7.0E-8	3.0E-7
16			7.0E-7
16.5		1.3E-6	
17	4.0E-6		
18			5.0E-7
19	4.0E-9		
20		3.0E-9	3.0E-8
22	2.0E-7		1.5E-7
22.5		3.0E-7	
23	2.0E-9		
23.5		3.0E-9	
25			1.0E-9
26		3.0E-9	
28	2.0E-6	1.3E-6	1.0E-7
30	3.0E-8	2.0E-8	2.0E-9
33			3.5E-8
35			1.0E-9
40	3.0E-8	2.0E-8	2.0E-8

FIGURE 3. Vehicle Idle Vibration, Linear Accelerations.

Frequency (Hz)	Displacement Spectral Density ($\mu rad^2/Hz$)		
	Longitudinal	Transverse	Vertical
1.0	3.0E-2	4.0E-1	3.0E-2
1.5	7.0E-2	5.0E+0	
2.0		3.5E+0	1.5E-1
2.5	7.0E-3	4.0E-1	9.0E-1
3.0		1.0E+0	9.0E-1
3.5	7.0E-1		7.0E-2
4.0	1.0E+0	2.0E+1	
4.5		5.0E+0	1.0E-2
5.0	1.0E-1		
5.5	4.0E-1	4.0E+1	1.5E-1
6.0		1.4E+1	6.0E-1
6.5	2.5E-2	1.0E-1	
7.0	4.0E-2		5.0E-4
7.5		5.0E-2	
8.0	2.0E-2		
8.5			6.0E-4
9.0	4.0E-2		
9.5		5.0E-2	
10.0	3.0E+0	1.0E-1	1.0E-2
11.0	2.0E+2	3.0E+1	
11.5			1.0E+0
12.5	2.0E+0	5.0E-2	4.0E-2
13.5	2.0E+1	2.0E+0	7.0E-1
14.0	9.0E+0		
15.0		9.0E-2	5.0E-2
16.5		9.0E+1	
17.0	7.0E+2	4.0E-1	
17.5			4.0E-3
18.0	4.0E+0		2.0E-4
20.0	2.0E-1	3.0E-2	2.0E-4
21.0	2.0E-2		1.0E-2
22.0		2.0E-1	
22.5	3.0E-3	3.0E-3	1.5E-2
23.5			6.0E-4
26.0	4.0E-2		
26.5		6.0E-3	7.0E-4
27.0	5.0E+0		
28.0		5.0E-2	
28.5	3.0E-2		4.0E-2
30.0			1.3E-3
31.5		5.0E-3	
32.0	2.0E-2		5.0E-4
32.5	2.0E-1	7.0E-2	
33.0			1.5E-2
34.5		7.0E-4	1.0E-3
35.0	2.0E-3		
38.0			1.5E-3
38.5	1.0E-1	4.0E-1	
40.0	5.0E-3	4.0E-3	4.0E-2

FIGURE 4. Vehicle Idle Vibration, Angular Accelerations.

Random		Swept Sine		
Longitudinal				
Frequency (Hz)	ASD(g^2/Hz)	Harmonic	Frequency(Hz) Low/High	Amplitude Low/High (g)
3	.0096	1	4.5 / 8	.29 / 1.03
5	.0360	2	14 / 24	.07 / .50
8	.0360			
10	.0120			
35	.0120			
80	.0072			
200	.0005			
500	.0005			
Transversal				
Frequency (Hz)	ASD(g^2/Hz)	Harmonic	Frequency(Hz) Low/High	Amplitude Low/high (g)
3	.0096	1	4.5 / 8	.18/1.49
7	.120			
9	.120			
12	.0120			
35	.0120			
80	.0072			
200	.0005			
500	.0005			
Vertical				
Frequency (Hz)	ASD(g^2/Hz)	Harmonic	Frequency(Hz) Low/High	Amplitude Low/high (g)
3	.004	1	4.5 / 8	.07/ .49
7	.0096			
9	.0960			
12	.0960			
35	.0120			
80	.0072			
200	.0005			
500	.0005			

FIGURE 5. Vehicle Road Vibration.

Frequency (Hz)	Acceleration Spectral Density (g^2/Hz)
5	.00049
20	.00790
250	.00790
500	.00196

FIGURE 6. Weapon Induced Shock-Random Spectrum-All Axes.

MK-19		M2	
Frequency (Hz)	Peak Acceleration	Frequency (Hz)	Peak Acceleration
Longitudinal			
6	.11	9	.15
12	.22	17.5	.26
36	.45	26.3	.31
		35.5	.50
Transversal			
6	.12	9	.51
12	.39		
Vertical			
12	1.01	17.5	.38
18	.65		

FIGURE 7. Weapon Induced Shock-Sine Profile.

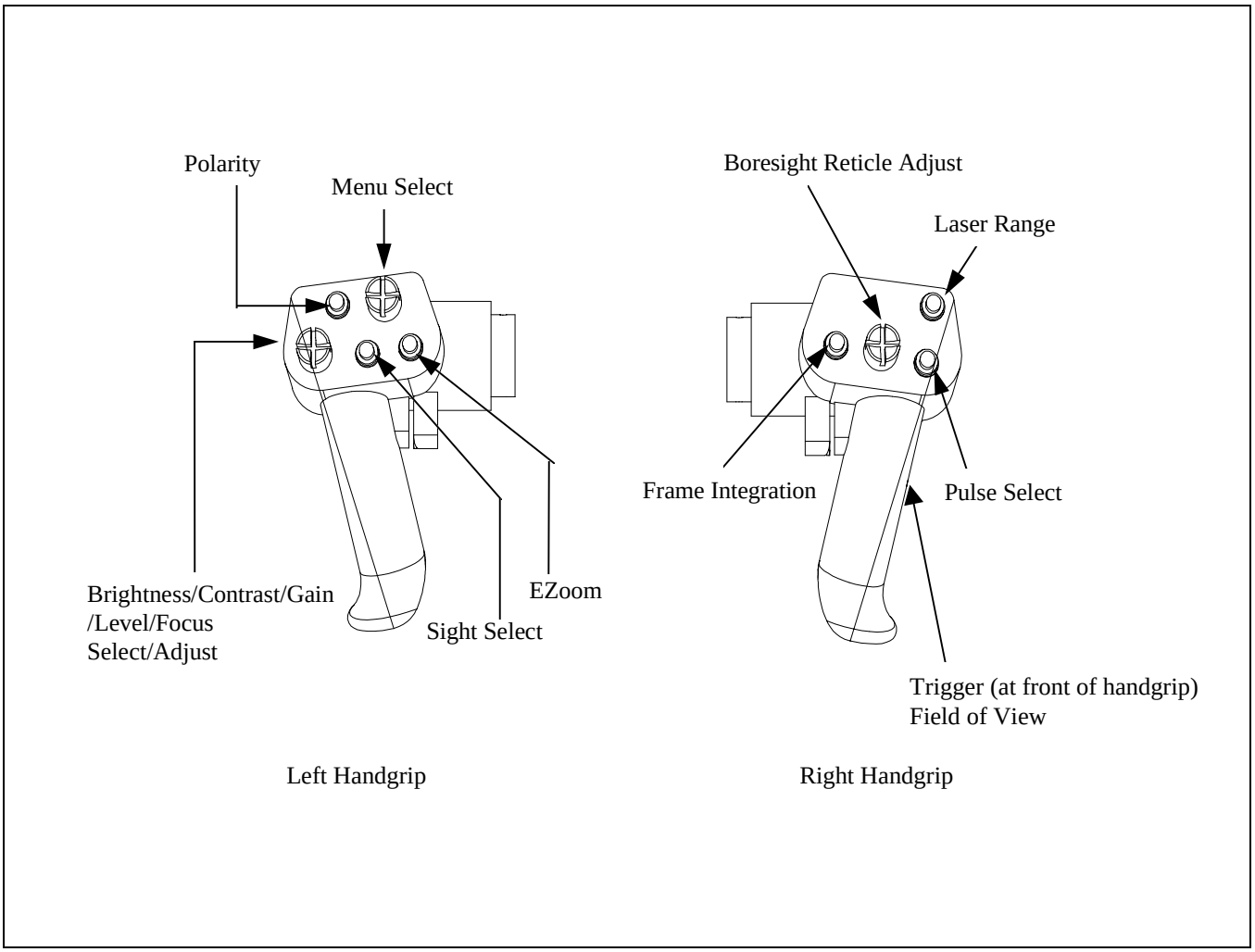

FIGURE 8. User Interface requirements (Handgrips).

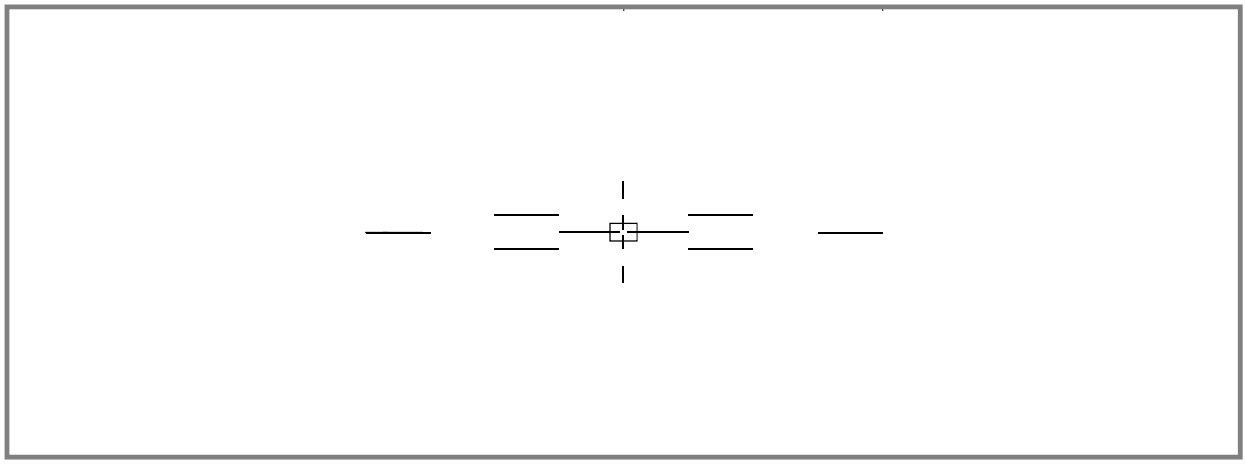

FIGURE 9. FLIR Narrow FOV Reticle.

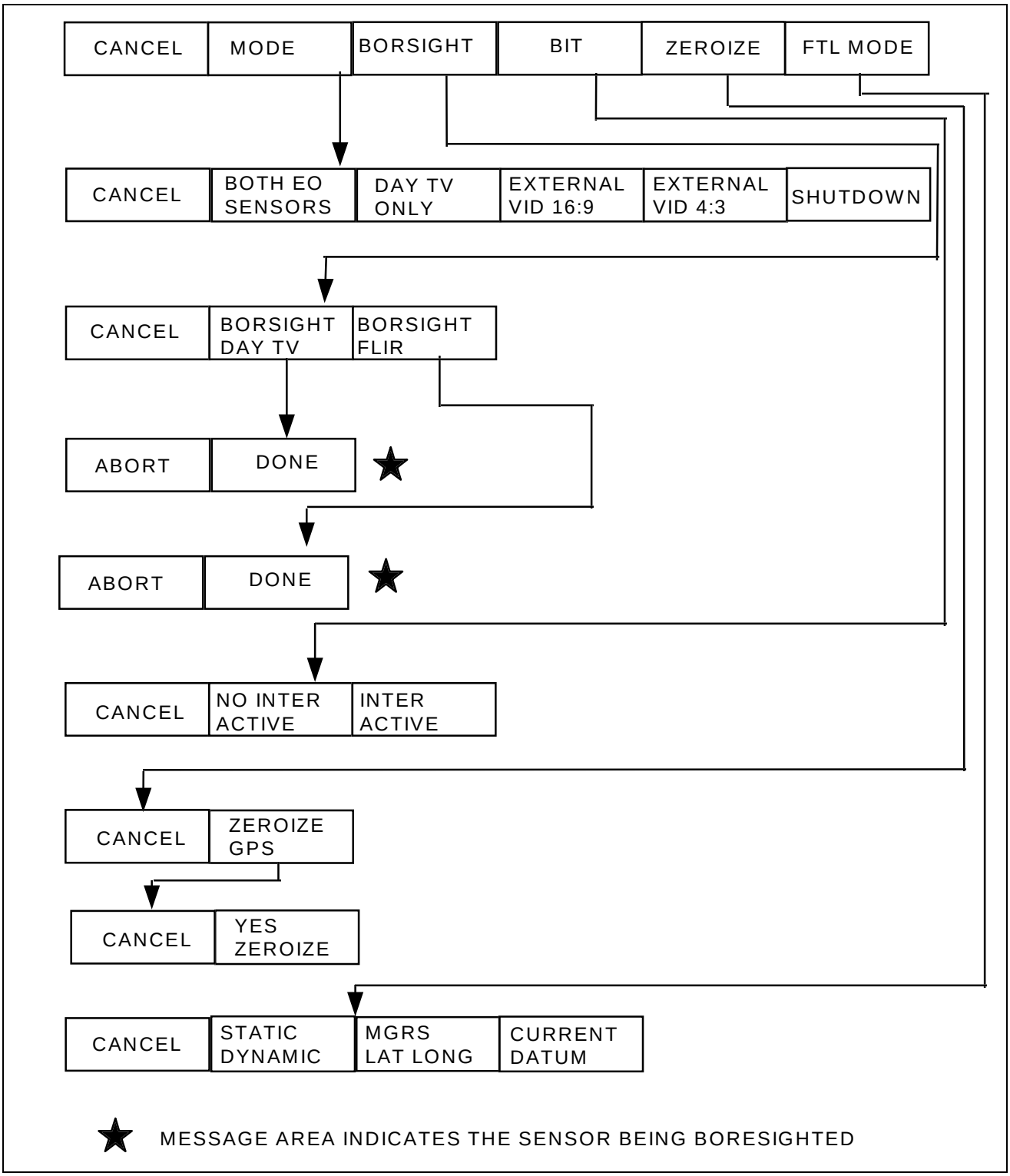

FIGURE 10. Main Menu Tree.

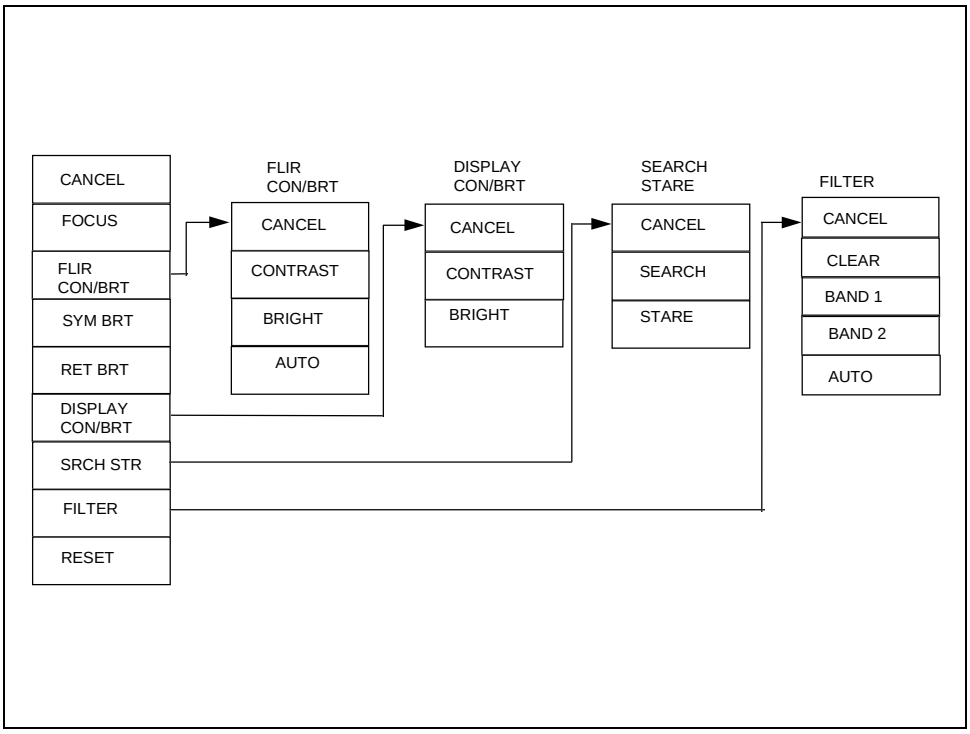

FIGURE 11. FLIR Menu.

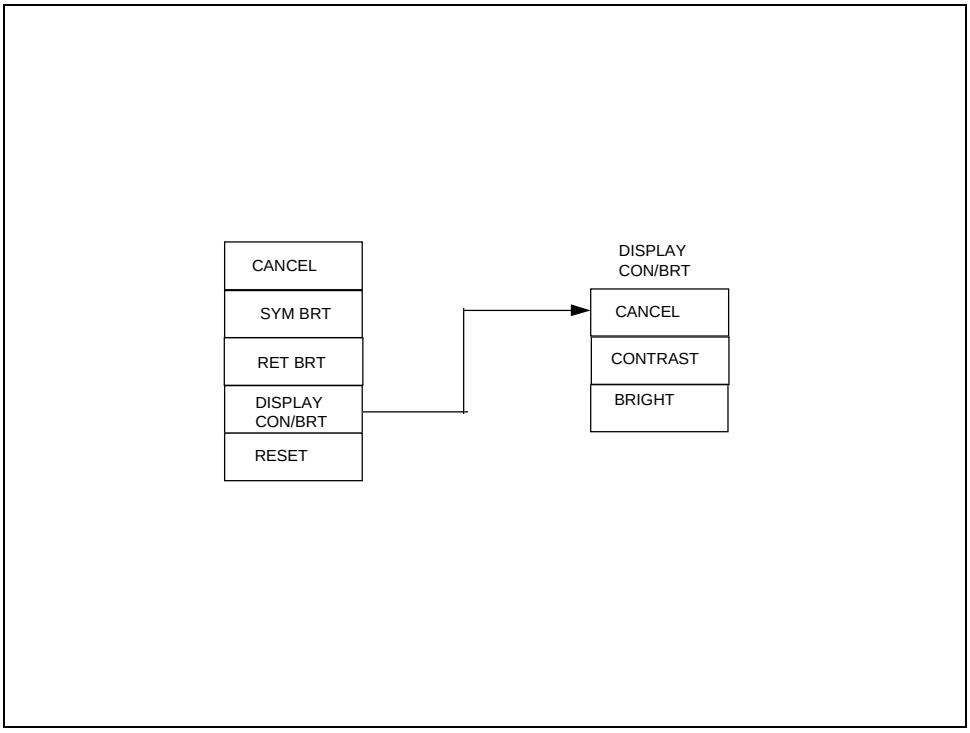

FIGURE 12. DVC Menu.

APPENDIX A

SYSTEM PERFORMANCE

(Copies of Appendix A are available from Project Manager, Night Vision/Reconnaissance, Surveillance and Target Acquisition, (PM-NV/RSTA) ATTN: SFAE-IEW&S-NV-SGF (M. ST. PETER), 10221 Burbeck Road, Fort Belvoir, VA 22060-5806.)

APPENDIX B

ELECTRO-OPTICAL COUNTER COUNTER MEASURE (EOCCM) REQUIREMENTS

(Copies of Appendix B are available from Project Manager, Night Vision/Reconnaissance, Surveillance and Target Acquisition, (PM-NV/RSTA) ATTN: SFAE-IEW&S-NV-SGF (M. ST. PETER), 10221 Burbeck Road, Fort Belvoir, VA 22060-5806.)

APPENDIX C

BIOLOGICAL AND CHEMICAL (BC) CONTAMINATION SURVIVABILITY CRITERIA FOR ARMY MATERIEL

C.1 PURPOSE

C.1.1 Purpose. To establish quantitative biological and chemical (BC) contamination survivability criteria for the LRAS3. Compliance to this appendix is mandatory.

C.2 SCOPE AND USE

C.2.1 Scope and use.

C.2.1.1 Quantitative criteria, expressed in terms of decontaminability, hardness, and compatibility, are designed to ensure that the LRAS3 can be used by personnel who are wearing protective clothing and equipment, and that such systems survive the effect of:

-- contamination by chemical and biological agents,

-- chemical and biological decontamination processes.

C.3 REQUIREMENTS

C.3.1 Biological and chemical (BC) survivability. Unless otherwise specified, the LRAS3 shall meet the decontaminability, hardness and compatibility requirements specified herein. Harnesses, front window potting material, and electrical connectors are not required to meet BC contamination survivability requirements.

C.3.1.1 Materials. The LRAS3 shall make maximum use of materials and coatings that minimally absorb BC contamination and thereby facilitate the rapid removal of contamination.

C.3.1.2 Design. The LRAS3 shall be designed to minimize contamination/decontamination residue on the surface, be accessible to decontamination and be sealed to prevent the ingress of contamination into the assembly.

C.3.2.2 Hardness design. The LRAS3 shall be hardened to ensure no more than 20 percent degradation over a 30 day period of performance as specified in 3.2 as caused by five (5) cumulative exposures to BC contaminants and associated decontamination processes specified in C 3.2.6.

C.3.2.3 Compatibility. Installation, removal and decontamination by trained, acclimatized personnel wearing BC protective ensemble shall not be degraded greater than 15 percent below levels specified for these tasks when accomplished in a non-BC environment.

C.3.2.4 BC contamination levels. The exterior and interior surfaces of materiel developed to perform mission-essential functions shall be designed such that BC contamination remaining on, or desorbed or reaerosolized from, the surface following decontamination shall not result in more than a negligible risk (as defined in Table C-I) to unprotected personnel working inside, on, or 1 meter from the item. The following (worst case) conditions apply:

a. Exterior surfaces initially are uniformly and separately contaminated with:

b. 10g/m^2 of thickened droplets of GD having a mass median diameter (MMD) of 2-5 mm.

c. 10g/m^2 of unthickened VX

d. 10g/m^2 of unthickened HD

e. 10^5 spores/m^2 of biological agent 1-5 micrometers in size.

f. Initial contamination levels on interior surfaces subject to contamination are a factor of 10 lower than on exterior surfaces in the absence of evidence to the contrary.

TABLE C.I. Negligible risk values for BC contaminant.

Contaminant			
Chemical Agent		Vapor/Aerosol (mg * min/m^3)	Liquid Δ (mg/70-kg man)
VX		0.25 (0.02 for visual acuity) ΔΔ	140
GD		2.5 (0.5 for visual acuity) ΔΔ	30
HD		50	180 (0.01 mg/cm^2) ΔΔΔ
Biological	Residue of no more than 500 spores/m^2 of the specified initial contamination levels.		

TABLE C.I. Negligible risk values for BC contaminant (continued).

NOTES:

Δ Applies to skin dose, not absorption through the eyes.

ΔΔ Applies to crew members whose visual acuity is critical to mission accomplishment.

ΔΔΔ Since the effect of HD is localized, it is not appropriate to consider a threshold dose of liquid HD as applying to the entire 70-kg man. Use of mass to body surface area units (mg/cm^2) to describe the dose for which negligible effects are observed is preferable with the provision that the location and surface area must be specified, since mild incapacitation depends on where the contamination exists and the extent of body surface involved.

C.3.2.6 Decontaminability. The LRAS3 shall be capable of being decontaminated to negligible risk levels identified in Table C.I when exposed to the levels of contamination specified in C.3.2.4 and the conditions specified:

a. Decontamination begins one hour after contamination using standard field decontaminants or stimulants, equipment, and procedures; and the decontamination process excluding monitoring shall not exceed 75 minutes.

b. Exposure of unprotected personnel to decontaminated materiel shall not exceed 12 hours based on the mission profile determined by the combat developer.

c. Surface temperature shall be 30°C and exterior wind speed no greater than 1.0m/sec.

APPENDIX D

NUCLEAR SURVIVABILITY

(Copies of Appendix D are available from Project Manager, Night Vision/Reconnaissance, Surveillance and Target Acquisition, (PM-NV/RSTA) ATTN: SFAE-IEW&S-NV-SGF (M. ST. PETER), 10221 Burbeck Road, Fort Belvoir, VA 22060-5806.)

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I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-A3264477, Revision C	2.DOCUMENT DATE (YYMMDD) 000329

3. DOCUMENT TITLE

PERFORMANCE SPECIFICATION FOR THE AN/TAS-8, LONG RANGE ADVANCED SCOUT SURVEILLANCE SYSTEM (LRAS3)

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) DSN (if applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME PM-NV/RSTA	b. TELEPHONE (Include Area Code) (1) Commercial (703) 704-1231 (2) DSN 654-1231
c. ADDRESS (Include Zip Code) SFAE-IEW&S-NV-SGF (M. St. Peter) 10221 Burbeck Road, Fort Belvoir, VA 22060-5806	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 DSN 289-2340

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